

THE CLAIMS

What is claimed is:

1. A method for fabricating a composite substrate which method
5 comprises:

forming a recess in a front face of at least one of a support substrate or a source substrate that includes a zone of weakness, the recess having a configuration that, in conjunction with the zone of weakness, assists in defining a transfer layer in the source substrate;

- 10 depositing a bonding material onto at least one of the front face of the source substrate or the front face of the support substrate;

bonding the front faces of the source and support substrates together in a manner to provide at least some of the bonding material in the recess; and

- 15 detaching the transfer layer from the source substrate along the zone of weakness to form a composite substrate comprising the transfer layer, bonding material and the support substrate.

2. The method of claim 1 wherein transfer layer has a periphery and the configuration of the recess corresponds to the periphery of the transfer layer.

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3. The method of claim 2 wherein the transfer layer periphery and recess are circular.

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4. The method of claim 2 wherein the recess comprises a groove or channel.

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5. The method of claim 2 wherein the recess is formed in the front face of the support substrate, the bonding material is deposited onto the front face of the source substrate as a uniform layer, and the bonding material enters the recess when the source and support substrates are bonded together.

6. The method of claim 2 wherein the recess is formed in the front face of the source substrate, the recess has a depth which extends to near the zone of

weakness, and the bonding material is applied onto the front face of the source substrate.

7. The method of claim 6 wherein the recess is configured to receive
5 bonding material so that the bonding material does not extend past the zone of weakness on outer portions of the source substrate.

8. The method of claim 6 wherein the bonding material in the recess protects the peripheral edge of the transfer layer.
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9. The method of claim 1 wherein the recess is formed through the entire thickness of the source substrate or the support substrate.

10. The method of claim 1 wherein recesses are formed through the entire
15 thickness of both the source substrate and the support substrate.

11. The method of claim 1 wherein the bonding material is releasable.

12. The method of claim 1 wherein the recess is formed by at least one of
20 wet etching or dry etching.

13. The method of claim 1 wherein the recess is formed by mechanical
machining.

25 14. The method of claim 13 wherein the mechanical machining is conducted using at least one of a saw or a laser beam.

15. The method of claim 1 which further comprises implanting atomic species into the source substrate to form the zone of weakness.

30 16. The method of claim 15 which further comprises forming the recess in the source substrate prior to implanting the atomic species.

17. The method of claim 1 which further comprises providing a porous layer in the source substrate to form the zone of weakness.

18. The method of claim 1 which further comprises providing a releasable bonding interface to form the zone of weakness.
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19. The method of claim 1 wherein the transfer layer is detached by applying a mechanical stress to the zone of weakness.

10 20. The method of claim 19 wherein the mechanical stress includes at least one of a tension, a bending stress or a shear stress.

21. The method of claim 1 wherein the transfer layer comprises a semiconductor material.

15 22. The method of claim 1 wherein the bonding material comprises an adhesive or adhesive material.

20 23. A composite substrate comprising a transfer layer, bonding material and the support substrate, wherein the bonding material is present in a recess having a configuration that assists in defining the transfer layer and as a layer that bonds the transfer layer to the support substrate.

24. The composite substrate of claim 23, wherein the transfer layer
25 comprises a semiconductor material and the bonding material comprises an adhesive or adhesive material.

25. The composite substrate of claim 23 wherein transfer layer has a circular periphery and the recess has a circular configuration.

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